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of the sample is unacceptable in the Applicant's elected embodiment. Using the Wennerstrum microwaves could result in unacceptable hot spots in the Applicant's sample material. Heating air to enter the chamber, as suggested by Dhaemers, doesn't work since in the elected species the sample chamber is closed and evacuated so that air pressure within the chamber is less than 10 TORR. Thus, consistent heat cannot be maintained by allowing heated air to enter the sealed chamber without compromising the vacuum in the sample chamber. Heating the chamber directly by infrared light both avoids hot spots and shortens the drying process by allowing a continuous high vacuum. Again, the prior art of both Wennerstrum and Dhaemers do not address the central problem addressed and solved by the Applicant's invention of completely and quickly drying a sample without affecting the material integrity of the sample. Adding Dhaemers to Wennerstrum does not correct the essential deficiencies regarding the need to evacuate the chamber to a vacuum greater than 10 TORR nor to heat the chamber in a controlled fashion while maintaining the vacuum at a predetermined range. Even if Dhaemers is appropriate to combine with Wennerstrum (the Applicant contends it is not), it does nothing to remedy the essential deficiencies of Wennerstrum. Consequently, Claims 27-28 and 30-31 are not obvious.

Claims 29 and 33-34

Claims 29 and 33-34 were rejected under Wennerstrum '851, Dhaemers '678, and further in view of Hunter et al., U. S. patent #6,085,443. The Examiner adds Hunter for the purpose of teaching the concept of using a load cell. However, adding Hunter does nothing to overcome the deficiencies of Wennerstrum which teaches away from a vacuum greater than 10 TORR nor does it do anything to overcome the deficiencies of combining Dhaemers with Wennerstrum and fails to disclose the use of infrared energy to directly heat a sealed vacuum chamber. Applicant incorporates by reference herein the arguments made in response to the rejections of Claims 23, 27-28, and 30-31 and will not repeat them here again.

Claim 32

Claim 32 is rejected under 35 U.S.C. as being unpatentable over the combination of Wennerstrum '851, Dhaemers '678, and Davis et al., U. S. Patent #6,410,889. Adding a heating pad by Davis does nothing to overcome the deficiencies of Wennerstrum and Dhaemers as

previously argued in the argument given above for Claims 23 and 27-28 and 30-31. Applicant incorporates those arguments regarding the deficiencies of Wennerstrum and Dhaemers by reference herein and will not repeat them.

Claim 1

Claim 1 was rejected under 35 U.S.C. 103(a) as being unpatentable over Wennerstrum '851 in view of Sano et al., U. S. Patent #4,107,049. As stated above, Applicant contends Wennerstrum does not have a vacuum pump capable of evacuating a chamber below 10 TORR nor does it teach the desirability of doing so. Consequently, the Examiner simply assumed that Wennerstrum's pump is capable of doing what Wennerstrum suggests it should not do, then, unsatisfied with this assumption, concludes that it would be obvious to modify the pump to Wennerstrum in order to achieve a vacuum less than 10 TORR. However, for Claim 1 the Examiner now adds Sano '049 to ":... teach a method for drying a porous material with the step of vacuuming the sealable chamber (5) under a pressure of .01 to 10 TORR". Consider what Sano '049 actually teaches, as opposed to the Examiner's characterization of Sano.

The Sano invention is a process of producing semi-permeable membranes. A membrane is prepared by a well known method. It produces a wet membrane. The wet membrane is dried overnight at room temperature. The then dry membrane is placed in a vacuum vessel shown in **Figure 1** (Sano column 6, lines 13-15). Consequently, Applicant traverses the conclusion of the Examiner that Sano teaches a method for drying porous material in a vacuum chamber with a pressure of .01 to 10 TORR. Sano does not teach drying in a vacuum chamber but uses the conventional method of drying in room temperature with exposure to air. This, as outlined in the Applicant's disclosure, is the prior art conventional method of drying asphalt or other porous samples for testing. The drawback to the prior art method, as again outlined in the Applicant's disclosure, is the length of time it takes to completely dry a sample. Sano uses a vacuum chamber but it is not for purpose of drying but for producing a plasma which penetrates into membrane substances for modifying the polyacrylonitril at the surface, allowing the membrane to be impermeable to a solute (Sano column 4, lines 46-50). Applicant concedes there are industrial processes such as Sano where a vacuum of less than 10 TORR is achieved for a variety of purposes

including creating a plasma to coat a membrane. What the Examiner has failed to do is find a drying process that uses a vacuum of less than 10 TORR with a controlled heat to rapidly dry a porous material. Except for the teaching of the Sano reference that it is possible to achieve a vacuum of less than 10 TORR in a sealed chamber, Sano is irrelevant to the Applicant's invention. The Examiner has not provided any reason as to why someone of skill in the art of drying porous materials would look at Sano, which is not a drying technology but a technology that uses plasma in coating a membrane. Only because the Applicant's invention suggests the desirability of a vacuum of less than 10 TORR is there any reason why Sano should be combined with Wennerstrum to remedy the essential deficiency of Wennerstrum. In the responses to Office Actions in this application, the Applicant requested that the Examiner justify the naked conclusion that Sano "teaches a method for drying porous materials" or that the Examiner provide some rational basis for combining Sano with Wennerstrum, without using the Applicant's own disclosure is a template for that combination. Applicant is still waiting for the Examiner's response to this request.

Claims 3-5 and 7-8

Claims 3-5 and 7-8 were rejected under the combination of Wennerstrum '851, in view of Sano '049, and further in view of Dhaemers '678. The Examiner uses the combination of Wennerstrum and Dhaemers and then adds the "infrared light as taught by Dhaemers." Applicant has already argued the inapplicability of Dhaemers in this prosecution. Moreover, Applicant has argued that even if Dhaemers is appropriate prior art in light of the restriction requirement imposed by the Examiner, Dhaemers still fails to disclose either actually using infrared light to directly heat the vacuum camber or the desirability to do so. Applicant will not repeat those arguments here but incorporates the arguments made in the Dhaemers reference.

Claims 6 and 9

Claims 6 and 9 were rejected under 35 U.S.C as being unpatentable over Wennerstrum '851, in view of Sano '049, Dhaemers '678, and further in view of Hunter. U. S. Patent #6,085,443. Hunter is used by the Examiner to teach the concepts of using a load cell for weighing a product. However the addition of Hunter does nothing to remedy the essential deficiencies of Wennerstrum '851, Sano '049, and Dhaemers '678 as previously argued by the Applicant. Those

arguments are incorporated by reference herein.

Claims 10 and 21

Claims 10 and 21 were rejected over the combination of Wennerstrum '851, Sano '049, Dhaemers '678, and further in view of Davis et al., U. S. Patent #6,410,889. The Examiner adds the Davis '889 reference to teach the concept of using a heating pad for heating the chamber as claimed. The Applicant has already argued the insufficiency of the combination of Wennerstrum , Sano, and Dhaemers above and will not repeat those argument here and adding Davis does nothing to remedy the essential deficiency of the above references.

Claims 1 and 23

The Examiner, apparently unsatisfied that the rejections for Claims 1 and 23 were adequate as earlier stated, offers an alternative grounds for rejecting Claims 1 and 23 by claiming Sano '049 in combination with Wennerstrum '851. The Examiner has previously rejected Claim 1 under a combination of Wennerstrum and Sano now rejects Claim 1 under a combination of Sano and Wennerstrum, a distinction without a difference. Here the Examiner reasons that Sano shows an apparatus and method for drying a porous sample in sample chamber (**50**) by creating a strong vacuum in the chamber a "heating means (**2-4**) " for heating the interior of the sealable chamber (**5**) as claimed. Applicant has already argued that Sano does not show a method or apparatus for drying porous materials inside a sample chamber by means of a vacuum. The Examiner draws on a well of imagination to create a heating means (**2-4**) in Sano. The Sano transformer (**2**) and electrodes (**3 and 4**) are designed to produce a plasma inside the sealed chamber. The Examiner calls this a "heating means." It is hard to imagine anyone, without the teaching of the Applicant's disclosure, would ever consider calling the plasma generator consisting of the transformer (**2**) and the electrodes (**3 and 4**) a heating means. Many industrial processes may produce some heat as a byproduct of the process. Applicant assumes that a transformer and electrodes may incidentally produce some heat in the same sense if the electrodes rust that may produce some heat from the oxidation process. There is no more reason to consider the plasma generator using transformer (**2**) and the electrodes (**3 and 4**) as a "heating means" than there is to consider a pile of leaves or a patent examiner as a heating means since both a pile of leaves and a patent examiner over time will

produce some heat. Consequently, the Applicant asks the Board to consider just how strained the Examiner's reasoning has become. The Examiner uses the Applicant's teaching to turn the Sano method for creating a semi-permeable membrane into a method for drying a porous sample, turns the Sano transformer and electrodes into a heating means, and then having transformed Sano into something that it is not, claims that it is reasonable to combine the now transfigured Sano reference with the Wennerstrum reference to render the Applicant's invention obvious. Applicant respectfully traverses this conclusion of the Examiner.

Claims 3-5, 7-8, 27-28, and 30-31

Claims 3-5, 7-8, 27-28, and 30-31 were rejected as unpatentable under 35 U.S.C. 103(a) over the combination of Sano '049, Wennerstrum '851, and Dhaemers '678. The Applicant has previously argued the inappropriateness of combining Sano with Wennerstrum and the deficiencies of the combination. The Applicant has previously argued the deficiencies of Dhaemers in combination with Wennerstrum. Those arguments are incorporated by reference herein and will not be repeated here.

Claims 6, 9, 29, and 33-34

The above combination of Sano '049, Wennerstrum '851, and Dhaemers '678 with the addition of Hunter et al., U. S. Patent #6,085,443 are used to reject Claims 6, 9, 29, and 33-34. Hunter is used by the Examiner to the combination of Wennerstrum, Sano, and Dhaemers to add the concept of using a load cell. However, the addition of Hunter does nothing to remedy the essential deficiencies of the combination of Wennerstrum, Sano, and Dhaemers. Applicant will not repeat the arguments regarding the deficiencies of the combination of Wennerstrum, Sano, and Dhaemers as they have been previously made at length in this Brief but will incorporate them by reference herein.

Claims 10, 31, and 32

Claims 10, 31, and 32 were rejected over the combination of Sano '049, Wennerstrum '851, Dhaemers '678 with the addition of Davis '889. Davis was added to the Wennerstrum, Sano, and Dhaemers combination to add a heating pad for heating the chamber. Adding Davis does not

remedy the essential deficiencies of the combination of Wennerstrum, Sano, and Dhaemers as has been argued above. Applicant incorporates those arguments herein by reference and will not repeat them here.

APPLICANT'S EVIDENCE

During the prosecution of this application, the case of KSR International Company v. Teleflex, Inc. et. al, 127 Sct. 1727, 82 U.S.P.Q. 2, 1385 was decided. It severely circumscribed, if not obliterated, the teaching, suggestion, motivation test (TSM) for obviousness. Rather the KSR case clearly reaffirmed other indicia of nonobviousness. The KSR case specifically relied upon flexible test of nonobviousness established Graham v. John Deere, Inc., 383 U.S. 1, 148 U.S.P.Q. 459, (1966). The Graham case established that there can be objective secondary indicia of nonobviousness, such as commercial success, long felt but unsolved needs, failure of others, etc. Graham, 148 U.S.P.Q. at 467. Attached to this Brief and accepted in the record in this case are three declarations and accompanying exhibits proving these secondary considerations of nonobviousness.

The first declaration is from Jan T. Womble, a Field Engineer with the North Carolina Department of Transportation. This Affidavit establishes an important part of the process of asphalt paving is to obtain the density of asphalt. Asphalt specimens must be dried to obtain accurate density. The Womble declaration establishes that: "We have retested hundreds of asphalt specimens that were fan dried and with the introduction of CoreDry, it has become apparent that fan drying is not very effective in completing the drying specimens as required in the specifications. CoreDry is by far the most effective way to completely dry asphalt specimens." (Womble Declaration, paragraph 2) Consequently, this application establishes it was a long felt but unmet need for effective drying of asphalt samples. This long felt but unmet need was met by the CoreDry embodiment of the Applicant's invention. Buttressing the Womble declaration is a second declaration for Christopher Bacchi, Laboratory Director for Tramat Materials Testing in Raleigh. Mr. Bacchi's declaration establishes that before CoreDry, testing for density took one full day (Bacchi Declaration, paragraph 2). The Bacchi Declaration goes on to establish the CoreDry has

reduced the time to dry an asphalt sample from the previous standard of up to 24 hours to less than one hour and that CoreDry: "...constitutes and (sic) important advance in asphalt testing" (Bacchi Declaration, paragraph 4). Buttressing the Bacchi and Womble declarations is a declaration from Ali Regimand, a co-inventor of the invention that is under appeal. This declaration establishes that the asphalt drying apparatus, as encompassed in the elected species in the Serial No. 10/714,471 application under consideration in this appeal, has been marketed under the trade name of "COREDRY" since 2004. The Regimand Declaration documents success in the market place for CoreDry. Because it is the only vacuum dryer for asphalt in the market place, the market place success cannot be due to extraneous factors such as price advantage or successful marketing. The Regimand Declaration goes on to establish that the CoreDry is now the ASTM standard for vacuum drying of porous materials such as asphalt. Hence, the CoreDry invention is not just accepted in the field but is now the standard for vacuum drying of asphalt samples. Thus, the Applicant's evidence establishes strong objective, unrebutted, evidence of nonobviousness.

CONCLUSION

102 Rejection - Claim 23

The Examiner uses the Wennerstrum reference as a 102 rejection. The Examiner does not argue any vacuum pump is inherently capable of producing a vacuum of less than 10 TORR (as is specifically required in Claims 23). It is well understood in patent law that anticipation under § 102 can only be found when the reference discloses exactly what is claimed and that where there are differences between the reference disclosure and the claimed rejection must be based on § 103 which takes differences into account. Titanium Metals Corp. v. Banner, 778 F.2d 775, 227 U.S.P.Q. 773 (Fed. Circ. 1985). The Wennerstrum reference specifically teaches the desirability of a vacuum of 10 TORR to 35 TORR. It also specifically teaches that complete drying of a sample is undesirable. Thus, the Wennerstrum reference does not disclose or teach a vacuum pump that can evacuate a chamber to a vacuum below 10 TORR. Wennerstrum is not a § 102 reference.

Claim 23 - Obvious Rejections

Recognizing the weakness of Wennerstrum as a 102 reference, the Examiner then

concludes that it was obvious to evacuate the Wennerstrum chamber to less than 10 TORR to achieve a "optimal" result. However, the optimal result as taught by the Wennerstrum reference itself avoids complete drying of the sample and mandates a vacuum of 10 TORR to 35 TORR , thus teaching away from the Applicant's invention. This is a classic case of hindsight reconstruction where the Examiner used the Applicant's own reference to suggest the desirability of a vacuum less than 10 TORR as an optional result.

The Examiner recognizing the weakness of this conclusion then uses the Sano as a prior art reference which does show a vacuum less than 10 TORR. The problem with Sano is that it is not in a field analogous to vacuum drying of porous samples. Indeed, the Sano reference is not a vacuum dryer or any kind of dryer. Again, the Examiner, recognizing the weakness of the Sano reference, characterizes the Sano reference as a "vacuum dryer" without one word of support in the Sano reference itself for that characterization. The Sano reference uses the vacuum to facilitate a plasma coating on a semi-permeable membrane and is no way analogous to vacuum drying of a porous sample. It seems apparent that the Examiner has used the Applicant's own teaching as a template to the desirability of a vacuum less than 10 TORR then searched through nonanalogous prior art to find an application where a vacuum less than 10 TORR is used, not for drying, but for coating of a membrane. The Examiner has not offered any reason why a person of common sense would look so far afield as a plasma coating technology to solve the problem solved by this invention, especially in light of the fact that the Wennerstrum vacuum dryer teaches away from a vacuum less than 10 TORR and teaches away from completely drying a sample. Despite requests from the Applicant, the Examiner has offered no explanation about why one of ordinary skill in the art exercising common sense, would look to plasma coating technology to solve the problem of rapid drying of porous material.

Dhaemers Reference

As part of the embodiment elected by the Applicant, electromagnetic energy is used to directly heat the sample during the vacuum drying process. This direct heating allows an uninterrupted high vacuum, unlike the unelected embodiment which periodically would release the vacuum to allow heated air to enter the sample chamber. The Examiner's reliance on the Dhaemers

reference, that uses heated air to enter the dryer, ignores the substantial structural and functional differences between the Applicant's elected embodiment and the unelected embodiment. As with Sano and Wennerstrum, the Examiner uses the Applicant's own application as a template to twist the Dhaemers reference to resemble the teaching and claims of the Applicant's invention to make a prima facie case of obviousness with the Dhaemers reference in combination with either Wennerstrum and/or Wennerstrum and Sano for some of Applicant's claims.

Even assuming the Examiner in fact made a prima facie case of obviousness, which the Applicant traverses, Applicant offered objective evidence of nonobviousness as outlined in Graham v. John Deere, Supra. This shows that the CoreDry embodiment of the Applicant's elected invention shown in Figure 2 has met a long felt but unmet need that constitutes a substantial advance in the art, is a commercial success, and is now the ASTM standard for the field. The Examiner had no answer for this objective proof of nonobviousness.

This is a classic case of hindsight reconstruction where the Examiner uses the teaching of the Applicant's own disclosure to find references, twists the teaching of those references to match the teaching of the Applicant's references, then hold the Applicant's invention either anticipated or obvious. Applicant respectfully requests the Board to reverse the tortured reasoning of the Examiner and allow the application and its pending claims.

This the 13 day of Dec., 2007.

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CERTIFICATE OF SERVICE

I, Michael E. Mauney, do hereby certify that a copy of the foregoing Brief of the Appellant in:

In Re Application: Tianqing He et al.

Filing Date: 11/15/03

Serial No: 10/714,471

Invention: DEVICE AND METHODS FOR RAPID DRYING OF POROUS MATERIALS

has this day been duly served upon:

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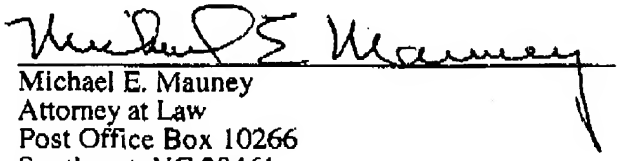

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CLAIMS APPENDIX

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CLAIMS

1. (Previously Amended) A method for rapid drying a porous sample of material, said method comprising the steps of :

(a) placing a porous sample of material into a sealable chamber;

(b) creating a strong vacuum inside said chamber by evacuating air from the inside of said chamber after it is sealed until air pressure inside said chamber is less than 10 TORR;

(c) passing evacuated air from said sealable chamber through a cold trap to trap moisture in said evacuated air;

(d) heating interior of said sealable chamber to a temperature within a predetermined range .

2.(Canceled)

3. (Previously Amended) A method as set forth in Claim 1 wherein said heating step includes heating the interior of said sealable chamber by supplying infrared light energy to said interior of said sealable chamber.

4. (Previously Amended) A method as set forth in Claim 3 wherein said heating step of supplying infrared light energy heats interior of said sealable chamber within room temperature range.

5. (Original) A method as set forth in Claim 4 further includes monitoring a specific parameter to determine if moisture is removed from said sample in said sample chamber.

6. (Original) A method as set forth in Claim 5 wherein said monitoring step includes weighing said sample in said sealable chamber a plurality of times during said method.

7. (Original) A method as set forth in Claim 5 wherein said monitoring step includes monitoring said vacuum in said chamber until it reaches a predetermined level.

8. (Original) A method as set forth in Claim 5 wherein said monitoring step includes monitoring humidity in said evacuated air until said humidity reaches a predetermined level.

9. (Original) A method as set forth in Claim 5 wherein said monitoring step includes removing said sample from said sealable chamber and weighing said sample on an external scale a plurality of times.

10. (Original) A method as set forth in Claim 5 wherein said heating step further includes using a heating pad with said sealable chamber.

11 - 20. (Canceled)

21. (Original) A method of Claim 10 further includes a step of using a controller to control said creating a vacuum step, said passing evacuated air step, said heating step, and said monitoring step.

22. (Canceled)

23. An apparatus for rapid drying a porous sample of construction material comprising:

(a) a sealable chamber with at least one outlet;

(b) a cold trap in fluid communication with said sealable chamber through said outlet;

(c) means for creating a strong vacuum in fluid communication with said cold trap and said sealable chamber; whereby said means for creating a vacuum will evacuate air from said sealable chamber until air pressure in sealable chamber is less than 10 TORR, said evacuated air passing through said cold trap before reaching said means for creating a vacuum;

(d) means for heating said sealable chamber to heat said porous sample inside of said sealable chamber to within a predetermined temperature range .

24 - 26. (Canceled)

27. (Previously Amended) An apparatus as set forth in Claim 23 wherein said means for heating is an infrared lamp.

28. (Original) An apparatus as set forth in Claim 27 which further includes means for monitoring a specific parameter to determine if moisture is removed from said sample.

29. (Original) An apparatus as set forth in Claim 28 wherein said means for monitoring comprises a load cell on which said sample is placed whereby the weight of said sample may be monitored. thus determining the amount of moisture in said sample.

30. (Original) An apparatus as set forth in Claim 28 wherein said means for monitoring comprises means for measuring said vacuum whereby said sealable chamber is maintained at a particular vacuum level.

31. (Original) An apparatus as set forth in Claim 28 wherein said means for monitoring comprises means for measuring humidity in said sealable chamber.

32. (Original) An apparatus as set forth in Claim 28 wherein said means for heating further comprises a heating pad used with said sealable chamber.

33. (Original) An apparatus as set forth in Claim 29 wherein said load cell is placed external to said sealable chamber and said sample is removed from said sealable chamber to be placed on said load cell to determine the weight of said sample.

34. (Original) An apparatus as set forth in Claim 33 further comprising a means for controlling said means for creating a vacuum, said means for heating, and said means for monitoring.

35 - 43. (Canceled)